

JANUARY 2017



Office of the Director of National Intelligence

IA RPA

BE THE FUTURE

N2N Challenge

Prize Calculations



UNCLASSIFIED



## Data Collection

### + **Baseline Legacy (BL)**

- Gold standard rolled 10 print enrollment with skilled operator A (BL\_N2N\_A)
- Gold standard rolled 10 print enrollment with skilled operator B (BL\_N2N\_B)
- Latent Collection via gold standard methods (BL\_L)
- Government may collect other data not used in challenge

### + **Prize Participant (PP)**

- Collect N2N using no skilled operator and whatever hardware/software the prize participant provides (PP\_N2N)



## Collection Time

- The time how long it takes to capture each session of N2N data will be a factor for the prize challenge
- Legacy N2N time for the US Government captured data will be referred to as M\_L\_T (Metric Legacy Time)
- Performer N2N time will be referred to as M\_P\_T (Metric Performer Time)
- Prize challenge metric/test: lowest median time to acquire fingerprint
  - $Median \times (1 + |skew|)$
  - *Tie-breaker: Lowest median time to capture a fingerprint*



# Recognition Criteria

	<b>BL_N2N_A</b> (10 Print Legacy Baseline Operator A)	<b>BL_L</b> Baseline Latent Set
<b>BL_N2N_B</b> (10 Print Legacy Baseline Operator B)	Metric Legacy Gallery Biometric ( <b>M_L_GB</b> )	Metric Legacy Latent Biometric ( <b>M_L_LB</b> )
<b>PP_N2N</b> (Prize Performer)	Metric Prize Participant Gallery Biometric ( <b>M_P_GB</b> )	Metric Prize Participant Latent Biometric ( <b>M_P_LB</b> )

- +  $FNIR @ FPIR = 10^{-1}$
- + *Tie-breaker: Average NFIQ 2.0 values and NFIQ 2.0 feature values*
  - *Frequency Domain Analysis\_Standard Deviation*
  - *Frequency Domain Analysis\_Mean*
  - *Ridge Valley Uniformity\_Mean*
  - *Ridge Valley Uniformity\_Standard Deviation*
- + False Positive Identification Rate (FPIR) = fraction of searches for which there is no mate in the enrolled set (N), but a candidate above a certain similarity threshold (T) was incorrectly returned at or above a pre-specified rank (R).
- + False Negative Identification Rate (FNIR) = the fraction of searches for which there **is** a mate in the enrolled set (N), but the mate was not returned at a pre-specified rank (R) above a certain known similarity threshold (T).



Prize: Master Builder - \$2,000 & Print Provider - \$8,000

### Master Builder:

- + This prize is for any contestant or team that is invited to and attends the Live Test at the Maryland Test Facility. There is one prize for each team that attends, totaling 12 available prizes.
  - Eligibility Criteria
    - Complete Stage 1, Complete Stage 2, Receive Stage 3 Live Test Invitation, and attend the Live Test at Maryland Test Facility

### Print Provider:

- + This prize is for any team that is invited to, attends the Live Test at the Maryland Test Facility, and provides all collected prints for IARPA research. There is one prize for each team that provides their prints, totaling 12 available prizes.
  - Eligibility Criteria
    - Provide all collected prints from the Live Test at the Maryland Test Facility.



## Prize: Gallery Accuracy \$25,000

### + This prize is for N2N matching

- Winner:
  - Best N2N to N2N matching performance
    - Best M\_P\_GB
- Eligibility Criteria
  - Device cannot be more than twice as slow as existing approaches
    - $M_P_T < 2 * M_L_T$
  - 90% of subject data captured



## Prize: Latent Accuracy \$25,000

### + This prize is for best latent matching

#### – Winner:

- Best N2N to Latent matching performance
  - Best M\_P\_LB

#### – Eligibility Criteria

- You cannot be more than twice as slow as existing approaches
  - $M_P_T < 2 * M_L_T$
- 90% of subject data captured



Prize: Speed \$25,000

- + This prize is for fastest capture time
  - Winner:
    - Fastest N2N capture time
      - Best M\_P\_T
  - Eligibility Criteria
    - Latent matching must be within 80% of the N2N baseline method
      - $M\_P\_GB > 0.8 * M\_L\_GB$
    - 90% of subject data captured





## Challenge Grand Prize: \$100,000

### + Best Useable Matching System

- Winner:
  - Best Latent Matching System
    - Best  $M\_P\_LB$
- Eligibility Criteria
  - Device must be no more than 20% slower than existing approaches
    - $M\_P\_T < 1.2 * M\_L\_T$
  - N2N matching performance must be no more than 2% worse than legacy/baseline
    - $M\_P\_GB > .98 * M\_L\_GB$
  - Latent matching performance must be no more than 2% worse than legacy/baseline
    - $M\_P\_LB > .98 * M\_L\_LB$
  - 90% of subject data captured